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2013

document version
Publisher's PDF, also known as Version of record

Road Traffic Incident Management and Situational Awareness

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Since the early 1970s, everywhere in the developed world, steadily growing traffic volumes and traffic intensity have led to enormous congestion and mobility problems, especially during the rush hours. The goal of sustainable mobility is one of the biggest challenges in modern traffic management. Traffic incidents have a significant impact on a reliable transport system. Incident Management is, in general, the policy that, through a set of measures, aims to reduce both the negative effects on the traffic flow conditions and the effects on safety, by shortening the period needed to clear the road after an incident has happened.

In many studies, information sharing and the introduction of new technologies have been identified as important constraints for the further improvement for cooperation. This thesis confirmed that the introduction of net-centric information systems significantly improves situational awareness to support effective decision-making.

Another contribution of this thesis is the use of mobile phone data to support traffic incident management. This thesis investigated the effects of hourly variations in mobile phone intensity on the number of traffic incidents on the highways of greater Amsterdam. The findings of our case study have statistically confirmed the use of such spatio-temporal data. These data can be seen as an additional tool, in terms of collective sensing, to develop an early warning system to detect motorway traffic incidents. In a broader perspective, such data can be also used to develop more sophisticated tools for larger disasters and crisis management.

John Steenbruggen (1965) obtained his bachelor's degree in Geodesy at the High Technical School Utrecht, his post bachelor's degree in Business Economics at the High Economic Administrative School Breda and his master's degree in Technology and Society at the Technical University Eindhoven. He is currently working at the Dutch ministry of Infrastructure and Environment. John is also affiliated as a visiting researcher with the VU University Amsterdam.